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Crosslinguistic semantics and the study of Greek*

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This paper describes and assesses the flow of ‘Greek semantics’, i.e. the study of semantic phenomena in the grammar of Greek, and of its syntax-semantics interface. Semantic studies of Greek started appearing in the late 1970’s and early 1980’s, and have been quite plentiful since then, with a well-defined formal semantic orientation in the 1990’s. The major topics in Greek semantics are discussed, including mood choice, sentential complementation, negation and polarity, tense-aspect modality, and ellipsis. Emphasis is given to how the semantic study of Greek connects to the larger crosslinguistic picture; more often than not, the results based on Greek call for modification of existing theories, and are shown to have significant theoretical implications for the overall design of grammar and, especially, the relation between morphology/syntax and semantics.

1. Prelude: delimiting the paradigm of ‘Greek semantics’

The study of linguistic meaning has long been the privilege of philologists, philosophers, and logicians, and it is only recently that it acquired the status of an autonomous research paradigm within modern linguistics. The turn occurs in the late 1960’s and the beginning of the 1970’s, most notably with the development of model-theoretic semantics. Through the years, natural language semantics has blossomed, and it now forms a fruitful paradigm within linguistics with a well-defined repertoire of techniques, which permit the formulation of theories with a high degree of explanatory adequacy and sophistication.

When we think of meaning in a pre-theoretical way, the first thing that comes to mind is the meaning of words; but semantics is not simply the study

of the vocabulary. In the framework of modern linguistics, where *grammar* describes the internal knowledge of a language (i.e., the linguistic competence of fluent speakers), semantics is the proper part of grammar whose aim is to describe their semantic competence. It is the module of grammar that enables speakers to assign meanings to atomic constituents, to derive complex meanings by combining the meanings of atomic constituents according to certain rules, and subsequently to understand whether a given combination is meaningful or not. As in every other area of modern linguistics, application of formal methods in semantics has been essential in attaining the desired degree of adequacy, precision, and testability in theorizing.

Apart from the integration of formal techniques, three other factors have contributed to the growth of natural language semantics. First, semantics has been vitalized by acknowledging the need to capture facets of meaning extending beyond truth-conditional meaning. This broadening of orientation is reflected in the theories of *dynamic* semantics, i.e. Dynamic Predicate Logic (Groenendijk & Stokhof 1991; Chierchia 1995), File Change Semantics (Heim 1982), and Discourse Representation Theory (Kamp & Reyle 1993), all of which, regardless of the varying executions, can be regarded as descending from Stalnaker's (1978) dynamic theory of assertion.¹ The leading idea is that sentences are not interpreted in isolation, but relevant to some context with the result of *updating* that context. A richer notion of meaning is therefore postulated incorporating features previously thought of as 'pragmatic', e.g. context dependency and change, and presupposition. The gap between semantics and pragmatics is today smaller than ever.

The second driving force has been adherence to the principle of *compositonality*. Compositionality postulates that the meaning of a sentence is a function of the meanings of its constituents and of the way in which they are combined. This means that semantics is *relational*: in order to attain the correct interpretation, a semanticist has to consider the syntactic form as well, to pair syntactic and semantic structure by assigning meanings to syntactic units, and to combine these meanings to achieve the desired sentence meaning. From this pairing the paradigm of the syntax-semantics interface was born.

Finally, the rapidly increasing crosslinguistic orientation has been a major push forward. Crosslinguistic semantics has given us a number of fascinating results that have quite often led to a better understanding of a variety of phenomena, and emphasized the need to reformulate narrow proposals based on the study of English. Crosslinguistic semantics has also made clear that the compositionality principle should be retained as the basic principle of semantic

interpretation, even when we describe languages whose surface structure is (much) different from that of English (for this especially see Bittner 1994).

As the title of this article suggests, the semantic study of Greek will be viewed as part of the crosslinguistic semantics program. (Following current practice, I will use “Greek” to refer to Modern Greek, unless indicated otherwise). Linguistic studies of the semantic phenomena of Greek started appearing in the late 1970’s and early 1980’s (Newton 1979; Newton & Veloudis 1980a,b; Veloudis 1979; Christidis 1982), and have been quite plentiful since then. We may use ‘Greek semantics’ as a cover term for the whole paradigm. This article, however, is not meant as a historical overview of the paradigm; rather, the primary goal is to highlight its major moments, emphasizing the progress that has been made, and the dynamics of future research. Naturally, the mode of presentation as well as the particular perspective I adopt could not but reflect my own training and orientation; nonetheless, I have tried to be as careful as I could in presenting the flow of Greek semantics as a whole in its attempt to describe and explain the particular characteristics of Greek and how they connect to the larger crosslinguistic picture.

In most studies in the 1980’s a primary goal was to *describe* the semantic phenomena of Greek. This orientation afforded a number of detailed and insightful descriptions, which have been subsequently embedded into the larger theoretical picture, especially in the 1990’s. A second characteristic of the earlier stage, which relates to the descriptive orientation, has been a reluctance to endorse formal semantic frameworks. As a typical result of this tendency, we find relatively few formal analyses (e.g. Newton 1979; Newton & Veloudis 1980; and Veloudis 1982), at the time when there is an explosion of formal semantics abroad — for instance with Montague grammar, generalized quantifier theory, file change semantics, tense- and possible world semantics. Instead, Greek scholars have favored non-formal or purely pragmatic approaches, in certain circles until today. In the 1990’s formal orientation gained ground; many current analyses take the earlier descriptive results as their starting point and cast them in formal semantic frameworks.

Certain topics have been extensively dealt with: sentential complementation, mood selection, negation, and polarity phenomena — the order here reflects a rough chronological approximation. Other topics have also attracted interest, e.g. the semantics of aspect, tense, modality, conditionals, (pseudo)clefts, and ellipsis. It will be impossible, of course, to consider all these topics in thorough detail in an article like this one. My main focus will be on the most recurring topics and on those of more current active interest, to the degree they

are concerned with the syntax-semantics interface within generative grammar.

Before proceeding, let me briefly remark on studies it was not possible to include in the discussion. There are numerous works on the lexical content of particles, constructions, and morphemes by linguists working on lexicography, sociolinguistics, and pragmatics. I should mention here, merely as indications, the following: Anastasiadi-Simeonidi (1997) on lexicographical aspects of the infixes like *-adikos*, *-atikos*, etc.; Kaloerinos (1993, 1998) on concessive expressions and cardinals respectively; Karatzola (1998) on *tulaxiston*, ‘at least’, Arhakis (1998) on “correctives” like *διλαδι* ‘that is to say’, *m’ala loja* ‘in other words’. I have not been able to consider these and similar works in any detail because to do so would be to take us deep into the further arena of pragmatics, an area of which space precludes a thorough investigation. Topics concerning questions of a more philosophical nature have also been excluded for the same reason.

The discussion proceeds as follows. In Section 2 sentential complementation and mood selection in complement clauses are considered. In Section 3 I discuss negation and polarity phenomena within the perspective of the syntax-semantics interface. Finally, in Section 4, I consider (a) tense, aspect modality, (b) ellipsis, and (c) pseudoclefts. I conclude by emphasizing the main results and suggesting directions for further research.

2. Sentential complementation and mood selection

Traditionally (*inter alia* Mackridge 1985; Holton et al. 1997), grammars of Modern Greek distinguish three moods, the indicative, the subjunctive, and the imperative. The former two, unlike their ancient Greek counterparts, are not marked morphologically on the verb, but the imperative is indeed marked by a bound morpheme attached to the verbal stem. Imperatives never occur as embedded clauses. The subjunctive is marked by preverbal particles, e.g. *na*, *as*. In the absence of such particles or imperative morphology we talk about indicative mood. Unlike imperatives, indicative and *na*-sentences may be used as main or embedded clauses.

It is a well-known property of Greek that it lacks infinitives. Sentential complements are always finite and come in three varieties: indicative *oti/pos*-complements, *pu*-complements, and *na*-complements. *Pu* clauses may additionally be characterized as factive (to be discussed in more detail below).

The syntax of mood has been central to the discussion of the Greek clause structure, but since this article is not about syntax, I will not consider the

syntactic issues in any detail. Philippaki-Warbuton (1985, 1994), and Philippaki-Warbuton & Veloudis (1984) posit that *na* is a mood morpheme generated in Mood⁰, rather than a complementizer (Agouraki 1993). The particle *tha*, otherwise indicating the future, can also have subjunctive-like modal uses, e.g. when construed with the imperfective past form as in *tha elega* ‘I would (like to) say that...’ (note that the English future modal has a parallel use); but in general the subjunctive *na* and the future modality of *tha* should be kept apart as distinct categories (for extensive arguments in favor of this point see Philippaki-Warbuton 1994: 308–312).

I assume that a simple Greek embedded clause has (at least) the structure in (1):

- (1) [_{CP} {pu/oti/Ø} [_{MoodP} {na/Ø} [_{T/AgrP} {tha/Ø} Verb [_{VP} t_{verb}]]]]

Additional projections might be needed for negation, topicalization, quantifier movement, focus placement and possibly other operations, but I ignore these complications here, as they are not relevant to the current discussion. Instead, I concentrate on the accounts of the semantic parameters regulating mood choice.

2.1 The issue of factivity

Both *oti/pos* and *pu* complements are indicative, but the two complementizers are not in free variation:

- (2) Χάρηκα {που/*ότι} είδα τον Αντρέα.
 xarika {pu/ *oti} ida ton andrea
 was-glad-1sg that saw-1sg the Andreas
 ‘I was glad that I saw Andreas.’
- (3) Είπα {*που/ότι} είδα τον Αντρέα.
 ipa {*pu/ oti} ida ton andrea
 said-1sg that saw-1sg the Andreas
 ‘I said that I saw Andreas.’
- (4) Θυμήθηκα {που/ότι} είδα τον Αντρέα.
 thimiθika {pu/ oti} ida ton andrea
 remembered-1sg that saw-1sg the Andreas
 ‘I remembered that I saw Andreas.’

- (5) Ξέρω {που/ότι} θα είναι στην ταβέρνα.
 ksero {pu/ oti} tha ine stin taverna
 know-1SG that FUT be-3SG in-the taverna
 ‘I know that he will be at the taverna.’
 (Christidis 1982:116)

Emotive factive verbs (also characterized as ‘psychological’ predicates because they express a psychological attitude of the speaker towards situations which are perceived as facts) are compatible with *pu* but not with *oti*, as we see in (2); assertive verbs, i.e. verbs like *say*, *report*, etc. used by speakers to present their complements as assertions in reported conversation, exhibit the opposite pattern in (3). Epistemic verbs express belief-related attitudes, and as we shall see in the next section, align with assertives. In (4) and (5), finally, we see that semi-factives (or, “cognitive factives”, i.e. factives containing an epistemic component) like *thimame* ‘remember’ and fully epistemic factive verbs like *ksero* ‘know’ are compatible with both *pu* as well as *oti/pos*.

What determines, then, which complementizer to use? Triandafyllides (1941:396) states that the complementizer “*pu* represents something more real than *pos*”; Christidis (1982) attempts a more precise characterization of what it means to be “more real”, by considering Kiparsky and Kiparsky’s (1971) hypothesis that factive verbs presuppose the truth of their complement. This analysis is summarized in (6), where “ \Rightarrow ” reads as “presupposes”:

- (6) I was glad that I saw Andreas \Rightarrow ‘I saw Andreas’ is true.

Emotive factives indeed give rise to this pattern, hence we can generalize that *pu* complements express propositions whose truth is presupposed, i.e. is part of the background discourse assumptions. That the truth of the complement here is a presupposition is further evidenced by the fact that it survives under negation (see Gamut 1990 for a discussion of the tests distinguishing entailments from presuppositions):

- (7) Δεν χάρηκα που είδα τον Αντρέα.
 den xarika pu ida ton andrea.
 ‘I wasn’t glad that I saw Andreas’ \Rightarrow ‘I saw Andreas’ is true.

Oti/pos clauses, on the other hand, may denote true propositions (see 2.2.3), but the truth is not presupposed. If I remember, or said that I saw Andreas, unless I am lying, it is true that I saw Andreas. But the truth inference is an entailment and not a presupposition as the negation test reveals; unlike *pu*- clauses, the truth of *oti* clauses does not survive under negation:

- (8) Δεν {είπα/θυμήθηκα} ότι είδα τον Αντρέα.
 δεν {ipa/ θimiθika} oti ida ton andrea.
 'I didn't {say/remember} that I saw Andreas' \nRightarrow I saw Andreas.

The *pu* version of the sentence with *δεν θυμήθηκα* 'didn't remember' gives us the expected pattern in (9a) and means what we see in (9b): 'It is true that I saw Andreas, but I don't remember it'. (This representation is reminiscent of Varlokosta's 1994 suggestion that factive verbs and their complements form paratactic rather than subordinating structures).

- (9) a. Δεν θυμήθηκα που είδα τον Αντρέα.
 δεν θυμήθηκα pu ida ton andrea \Rightarrow I saw Andreas.
 b. saw (I, Andreas) \wedge \neg remember (I, saw (I, Andreas))

So the *pu* clause is interpreted outside the scope of negation. In Giannakidou (1998:235–236) it is suggested that this indicates that the *pu* clause undergoes LF-movement past negation. *Oti* clauses, by contrast, can stay *in situ* and be interpreted inside the scope of negation.

Christidis notes some problems with the strict presuppositional analysis of *pu*. Verbs like *ksero* 'know', for instance, seem to presuppose their truth, even when they select *oti* complements (Christidis 1982:118–119), as illustrated below:

- (10) Η Αριάδνη ξέρει ότι η γη είναι στρογγυλή.
 i ariaðni kseri oti i ji ine strogili
 'Ariadne knows that the earth is round.' \Rightarrow The earth is round.
- (11) Η Αριάδνη είναι μικρή και δεν ξέρει ακόμη ότι η γη είναι
 i ariaðni ine mikri ke den kseri akomi oti i ji ine
 στρογγυλή.
 strogili
 'Ariadne is little and she doesn't know yet that the earth is round.'
 \Rightarrow The earth is round.

Hence we cannot maintain that only *pu* complements presuppose truth. Clearly, a successful description of the difference between *pu* and *oti* complements cannot be made unless we consider the semantics of the embedding predicates. Truth is preserved with *ksero* 'know' because this verb licenses 'strong' truth inferences, but *thimame* 'remember' allows only a 'weaker' truth inference. This difference can be formally stated in terms of weak and strong veridicality, as argued in Giannakidou (1999): a sentence of the form *x kseri p* 'x knows p' entails that p is true both with respect to the one who knows, x, and the speaker; but with *x thimate p* 'x remembers p' the second inference is not

valid — *x* may remember as true something that the speaker considers false (for more discussion see 2.2.2). Christidis appeals to the notion of (in)directness which, however, is less amenable to a formal description.

I consider next the issue of mood selection. We will revisit factivity and the differences between *pu* and *na* clauses as a subpart of that discussion.

2.2 Mood selection in complement clauses

Mood selection in main and complement clauses has been among the most treated topics in Greek semantics, and numerous studies contain discussions of it: *inter alia*, Christidis (1983), Veloudis & Philippaki-Warburton (1983), Philippaki-Warburton & Veloudis (1984), Veloudis (1983/4), Rouchota (1994), Giannakidou (1994, 1997, 1998). In (12), (13), and (14) we see the basic classification; every approach, essentially, has attempted to provide an explanation for it.

- (12) Verbs selecting the indicative (*oti/pu* clauses)
assertives: λέω *leo* ‘say’, ισχυρίζομαι *ixirizome* ‘claim’
fiction verbs: ονειρεύομαι *onirevome* ‘dream’, φαντάζομαι *fandazome* ‘imagine’
epistemics: πιστεύω *pistevo* ‘believe’, νομίζω *nomizo* ‘think’
factives: χαίρομαι *xerome* ‘be glad’, γνωρίζω *gnorizo* ‘know’, μετανιώνω *metanjono* ‘regret’
semifactives: ανακαλύπτω *anakalipto* ‘discover’, θυμάμαι *thimame* ‘remember’
- (13) Verbs selecting the subjunctive (*na* clauses)
volitionals: θέλω *thelo* ‘want’, ελπίζω *elpizo* ‘hope’, σκοπεύω *skopevo* ‘plan’
directives: διατάζω *djatazo* ‘order’, συμβουλεύω *simvulevo* ‘advise’,
προτείνω *protino* ‘suggest’
modals: (invariant) πρέπει *prepi* ‘must’ (deontic and epistemic), είναι {δυνατόν/πιθανόν} *ine {dinaton/piθanon}* ‘it is possible’
permissives: επιτρέπω *epitrepo* ‘allow’
negative: αποφεύγω *apofevgo* ‘avoid’, αρνούμαι *arnume* ‘refuse’, απαγορεύω *apagorevo* ‘forbid’
verbs of fear: φοβάμαι *fovame* ‘be afraid’

The subjunctive is also selected by verbs like the ones below:

- (14) *aspectual*: αρχίζω *arxizo* ‘start’, συνεχίζω *sinexizo* ‘continue’
perception: βλέπω *vlepo* ‘see’, ακούω *akuo* ‘hear’

commissives: αναγκάζομαι *anagazome* ‘be forced’, υπόσχομαι *ipoxome* ‘promise’

implicatives: καταφέρνω *kataferno* ‘manage’

There are also cases of ‘double’ mood selection. For example, epistemic verbs like *pistevo* ‘believe’ and *ksero* ‘know’ can occasionally take *na*-complements, factives may select *na*-clauses when they do not refer to facts, and perception verbs are found with *oti*, *pu*- complements too.² With perception verbs, mood choice is determined by whether perception is direct or indirect. In the former case, the subjunctive is used; in the case of the latter, one has to use the indicative (see Christidis 1983; Philippaki-Warbuton & Veloudis 1984). Mood shifts are pervasive in Romance too (see e.g. Farkas 1985 and Quer 1998); sometimes negation of an indicative verb alone suffices to trigger subjunctive in the complement, a phenomenon interesting in itself, but only marginally attested in Greek (see Philippaki-Warbuton & Veloudis 1984:fn. 4, p.161), and Giannakidou (1995), from which the following example is taken:

- (15) a. Νομίζω { *να έρθει/ ότι θα έρθει } ο Γιάννης.
 nomizo { *na erθi/ oti tha erθi } o janis
 think-1SG SUBJ come-3SG that FUT come-3SG the John
 ‘I think that John will come.’
- b. Δεν νομίζω { να έρθει/ ότι θα έρθει } ο Γιάννης.
 den nomizo { na erθi/ oti tha erθi } o janis
 not think-1SG SUBJ come-3SG that FUT come-3SG the John
 ‘I don’t think that John will come.’

In the light of such facts one might view the subjunctive as a polarity item (as Giannakidou 1995 does).

2.2.1 Earlier approaches

The basic question is what the semantic factor is that regulates mood choice. Traditional grammars tend to describe the difference as a contrast between *realis* (indicative) and *irrealis* (subjunctive). Yet a mere look at the types of predicates involved suggests that this cannot be the intended formal distinction: *irrealis* verbs, like *pistevo*, ‘believe’, *nomizo* ‘think’ and *onirevome* ‘dream’ select the indicative and not the subjunctive; and conversely, obvious *realis* verbs meaning ‘see’, ‘start’, and ‘manage’ select the subjunctive and not the indicative.

Christidis (1983) proposes that the difference between the subjunctive and the indicative should be understood in terms of transient (subjunctive) versus permanent (indicative) properties. This would explain why the subjunctive is

used with the aspectual class of verbs which indicate change, but it raises, among others, the problem of how to understand the complement of verbs like *believe* and *dream* as denoting ‘permanent’ states.

Veloudis & Philippaki-Warbuton (1983), and Philippaki-Warbuton & Veloudis (1984) propose instead that the difference can be explained by appealing to extensionality and intensionality: subjunctive verbs are intensional, but indicative verbs are extensional. The contrast in question is the one from classical intensional logic. Intensional verbs introduce a set of possible worlds and their complements must be evaluated with respect to that set. With extensional verbs, on the other hand, we do not consider other worlds, but only the actual one, w_0 . This difference explains why substitution of coreferential terms *salva veritate* holds only in extensional contexts:

(16) *Principle of Extensionality*

In any situation where s and t are referential expressions, and $s = t$, the following holds: $[t/s] \varphi \leftrightarrow \varphi$

If expressions s and t refer to the same individual, in an extensional context we can substitute them *salva veritate*. In intensional contexts this cannot be done, as we see below:

- (17) a. John hit Frank.
 b. Frank is Mary’s husband.
 c. \therefore John hit Mary’s husband.
- (18) a. John wants to hit Frank.
 b. Frank is Mary’s husband.
 c. Not necessarily: John wants to hit Mary’s husband.

From the two premises in (18) we cannot conclude *c*. This is so because Frank happens to be the individual satisfying the description ‘husband of Mary’ in the actual world w_0 , but in another world w_1 this may not be the case: the husband of Mary may be another individual in w_1 , say Paul. So, the fact that verbs like *want* make us consider possible worlds creates opacity. This opacity is not observed with extensional verbs like ‘hit’, as only the actual world w_0 is taken into consideration, and Frank is Mary’s husband in w_0 .

Appealing to formally well-understood notions like intensionality and extensionality is certainly on the right track, and, additionally, it embeds the discussion of Greek in the general discussion of mood choice in other languages, where such tools have been standardly employed (see, for example Farkas 1985). Yet empirical problems arise with the position that subjunctive verbs are

intensional, and indicative ones extensional. The most important obstacle seems to be that verbs meaning *believe*, *think* and *dream* select the indicative, although they are standardly intensional in the classical literature (Hintikka 1962, 1969; Quine 1953).³ Second, the verbs in (14) are extensional, but they select the subjunctive. It is difficult to see how these two cases can be handled to fit the proposed pattern. Essentially, the problem here is parallel to the one that plagues the *realis* versus *irrealis* approaches.

Veloudis (1987) seems to abandon the intensionality approach, and, focussing on *na*, suggests a reformulation of the subjunctive in terms of the notion of ‘directness’. ‘*Na* indicates lack of directness’ in this view (Veloudis 1987:294)⁴; the lack of directness is also used to explain the future orientation of sentences with *na* (Veloudis 1987:296). Although ‘directness’ is never actually defined, it seems correct to paraphrase it as ‘belonging to the actual world’. Hence the claim is that when *na* applies to a verb form, it creates a situation which cannot at the time of utterance be perceived as belonging to the actual world, but may be at some time in the future. In this sense, directness looks like a variant of intensionality, and as such, it inherits the problems faced by the latter, that I just mentioned; but it additionally obscures the relevant distinctions, since the notion remains formally vague. Moreover, the connection to the future presents empirical problems. For instance, contrary to what directness would lead us to expect, verbs of *direct* perception in fact select *na*-complements, and the claim that *na* complements have future orientation does not seem to hold generally: *na* is construed with certain nonveridical connectives like *prin* ‘before’, *isos* ‘perhaps’ and *xoris* ‘without’, without yielding future interpretations in all cases (see Giannakidou & Zwarts to appear):

- (19) a. Ο Παύλος ίσως να {γράψει/έγραψε} ένα άρθρο.
 o pavlos isos na {yrapsi/eyrapse} ena arthro
 the Paul perhaps SUBJ write-3sg/wrote-3sg an article
 ‘Paul perhaps will write an article.’
 ‘Paul wrote an article perhaps.’
 b. ...{χωρίς/ πριν} να γράψει ένα άρθρο.
 ...{xoris/ prin} na yrapsi ena arthro
 without before SUBJ write-3sg an article
 ‘...without writing an article.’
 ‘...before writing an article.’

Here, future readings may arise with *isos* ‘perhaps’, but in (19a) future orientation depends not on *na*, but on the tense following *na*. Likewise, future orientation

in (19b) arises only if the semantics of the particles allow it; *xoris* ‘without’ will not yield future readings because *xoris* itself has no future meaning, but with *prin* ‘before’ future orientation is licensed by the semantics of this connective, as we see below (from Giannakidou & Zwarts to appear).

$$(20) \quad [[A \text{ PRIN } B]] \text{ is true iff } \exists t \exists t' A(t) \wedge B(t') \wedge t < t'$$

According to this semantics, the time of the *prin* clause (B) follows the time of the main clause (A), hence B is future with respect to A. Future readings with *na*, then, can be seen as a consequence of the semantics of the connective and not an inherent contribution of *na* itself. Likewise, the *na* complement of a verb like *thelo* ‘want’ or *protino* ‘suggest’ will have future interpretation, but the *na* complement of a verb like *vlepo* ‘see’ will not.

To sum up, we saw that none of the approaches discussed in this section enables a complete and unproblematic characterization of the semantic factor regulating mood choice. In the next section, I present the account based on the notion of (non)veridicality, which seems to be more successful in achieving this goal.

2.2.2 (Non)veridicality in the semantics of mood

In a series of works, Giannakidou (1994, 1995, 1998, 1999) proposed an account of mood choice based on the notion of (non)veridicality. This account incorporates the insights of the intensionality-based and the (*ir*)*realis* approaches, but avoids the empirical problems of these by acknowledging a divide within the class of intensional verbs based on the availability of at least one truth inference. If an intensional verb allows such an inference, then it will be veridical and select the indicative; if not, it will be nonveridical and select the subjunctive.

(Non)veridicality is defined in Montague (1969) in terms of existence, but in Giannakidou’s work it is formalized based on truth inferences (see also Zwarts 1995). (There is of course, and intuitive connection between existence and truth which becomes relevant in the discussion of mood choice in relative clauses in 3.1).

- (21) **DEFINITION 1** (Relativized (non)veridicality for propositional operators)
[Giannakidou 1999: 388]

Let $c = \langle \text{cg}(c), W(c), M, s, h, w_0, f, \dots \rangle$ be a context.

- i. A propositional operator *Op* is *veridical* iff it holds that: $\llbracket Op \text{ p} \rrbracket_c = 1 \rightarrow \llbracket p \rrbracket = 1$ in some epistemic model $M_E(x) \in c$; otherwise *Op* is non-veridical.
- ii. A nonveridical operator *Op* is *antiveridical* iff it holds that: $\llbracket Op \text{ p} \rrbracket_c = 1 \rightarrow \llbracket p \rrbracket = 0$ in some epistemic model $M_E(x) \in c$.

A propositional operator is veridical iff the truth of $Op\ p$ in c requires that p be true in some individual's epistemic model $M(x)$ in c . If the truth of $Op\ p$ in c does not require that p be true in some such model in c , Op is nonveridical. A nonveridical operator Op is antiveridical iff the truth of $Op\ p$ in c requires that p be false in some epistemic model $M(x)$ in c . Antiveridical operators are essentially negative operators and they form a proper subset of the nonveridical (**antiveridical** \subset **nonveridical**).

Relativization of (non)veridicality with respect to epistemic models is motivated by the need to deal with the veridicality properties of propositional attitudes. Models are construed as sets of worlds relative to an individual:

(22) **DEFINITION 2** (Models of individuals).

Let $c = \langle cg(c), W(c), M, s, h, w_0, f, \dots \rangle$ be a context.

A model $M(x) \in M$ is a set of worlds associated with an individual x . x is the individual anchor.

An epistemic model is a set of words compatible with what x believes. The term *individual anchor* is borrowed from Farkas (1992). The idea is that sentences are not true or false in isolation, but with respect to some individual. Before we consider propositional attitudes, let me illustrate how (non)veridicality works for the simple cases.

Adverbs like *xθes* 'yesterday', are typical examples of veridical operators.

- (23) $X\theta\epsilon\varsigma, \text{ o } \Pi\acute{\alpha}\upsilon\lambda\omicron\varsigma \epsilon\acute{\iota}\delta\epsilon \acute{\epsilon}\nu\alpha \varphi\acute{\iota}\delta\iota. \rightarrow \text{ O } \Pi\acute{\alpha}\upsilon\lambda\omicron\varsigma \epsilon\acute{\iota}\delta\epsilon \acute{\epsilon}\nu\alpha \varphi\acute{\iota}\delta\iota.$
 $x\theta\epsilon\varsigma \text{ o } p\alpha\nu\lambda\omicron\varsigma \text{ i}\delta\epsilon \text{ ena } \varphi\acute{\iota}\delta\iota$
 'Yesterday, Paul saw a snake.' \rightarrow Paul saw a snake.

The veridicality of *yesterday* relates to the past tense, which is also veridical. Logical conjunction is veridical too, in both argument positions (Zwarts 1995). In the absence of embedding, the individual anchor is the speaker and the truth entailment holds in his/her model of evaluation (not indicated here because no other model is available).

Typical nonveridical operators are: the question operator, modal verbs, modal adverbs like *isos* 'perhaps' and *piθanon* 'possibly', and future oriented adverbs and particles. Likewise, temporal connectives like *prin* and its counterpart *before* are nonveridical. Again, the model of evaluation is the speaker's, since we are dealing with unembedded sentences:

- (24) $\epsilon\acute{\iota}\delta\epsilon \text{ o } \Pi\acute{\alpha}\upsilon\lambda\omicron\varsigma \acute{\epsilon}\nu\alpha \varphi\acute{\iota}\delta\iota; \rightarrow \text{ O } \Pi\acute{\alpha}\upsilon\lambda\omicron\varsigma \epsilon\acute{\iota}\delta\epsilon \acute{\epsilon}\nu\alpha \varphi\acute{\iota}\delta\iota.$
 $i\delta\epsilon \text{ o } p\alpha\nu\lambda\omicron\varsigma \text{ ena } \varphi\acute{\iota}\delta\iota$
 'Did Paul see a snake?' \rightarrow Paul saw a snake.

- (25) Μπορεί ο Παύλος να είδε ένα φίδι. \nrightarrow Ο Παύλος είδε ένα φίδι.
 bori o pavlos na ide ena fidι
 ‘Paul may have seen a snake.’ \nrightarrow Paul saw a snake.
- (26) Ίσως ο Παύλος να είδε ένα φίδι. \nrightarrow Ο Παύλος είδε ένα φίδι.
 isos o pavlos na ide ena fidι
 ‘Perhaps Paul saw a snake.’ \nrightarrow Paul saw a snake.
- (27) Πιθανόν ο Παύλος να είδε ένα φίδι.
 pithanon o pavlos na ide ena fidι \nrightarrow Ο Παύλος είδε ένα φίδι.
 ‘Paul possibly saw a snake.’ \nrightarrow Paul saw a snake.
- (28) Ο Παύλος έφυγε πριν (να) έρθει η Αριάδνη.
 o pavlos efije prin (na) erthi i ariaadni \nrightarrow Έρθε η Αριάδνη.
 ‘Paul left before Ariadne came.’ \nrightarrow Ariadne came.

We see here that *na*-selecting particles, modal verbs, adverbs and connectives are nonveridical. With temporal adverbials and connectives, the nonveridicality inference will have to be further constrained with respect to times, but I will not consider this issue here (see Giannakidou and Zwarts to appear). The fact that *na*-clauses are licensed by nonveridical elements allows us to formulate the hypothesis that *na* is triggered by nonveridicality.

Negation and *without* are typical antiveridical operators; again, in unembedded cases only the speaker’s model is available.

- (29) Ο Παύλος δεν έφυγε. \rightarrow Δεν είναι αλήθεια ότι ο Παύλος έφυγε.
 o pavlos den efije
 ‘Paul did not leave.’ \rightarrow It is not the case that Paul left.
- (30) ...χωρίς να φύγει ο Παύλος.
 xoris na fiji o pavlos \rightarrow Δεν είναι αλήθεια ότι ο Παύλος έφυγε.
 ‘...without Paul leaving.’ \rightarrow It is not the case that Paul left.

Antiveridical operators are intuitively ‘negative’, and are also compatible with *na*, as we see in (30); recall also that negation triggers *na* in example (15b).

Going back to the mood distinction in propositional attitudes, we see that veridicality enables us to unify the group of indicative-selecting verbs as a natural class. Consider, for instance, *pistevo* ‘believe’ and its ilk. These verbs express relations between individuals and propositions, for which it holds that the main clause subject is committed to the truth of the embedded proposition. Though the speaker might disagree, a prerequisite for *p* to be true in (31) is that

Jacob's epistemic model be a subset of the worlds where p is true: $M_E(\text{Jacob}) \subseteq p$, i.e. Jacob must be committed to *Ariadne loves Paul* if he believes it. The speaker may believe or even know that what Jacob believes is false, but this is irrelevant for Jacob's beliefs.

- (31) $\llbracket \text{Jacob believes that Ariadne loves Paul} \rrbracket_c = 1$ iff $\llbracket \text{Ariadne loves Paul} \rrbracket_{ME(\text{Jacob})} = 1$

Hence, *believe* is veridical according to our definition: $\llbracket \text{pistevo}(\text{su}, p) \rrbracket_c = 1 \rightarrow \llbracket [p] \rrbracket_{MB(\text{su})} = 1$. The same holds for *think*, *imagine*, *dream* (where the dream worlds replace the actual world), assertive verbs, and of course factives, where an additional veridical inference is derived with respect to the speaker's model too. In the case of factives, then, it may be appropriate to talk about *strong* veridicality (for more details see Giannakidou 1998, 1999).

The subjunctive-selecting verbs in (13), on the other hand, are non-veridical. Consider *thelo* 'want'. Intuitively, "wanting something is preferring it to certain relevant alternatives, the relevant alternatives being those possibilities that the agent believes will be realized if he does not get what he wants." (Stalnaker 1984: 89). The anchoring model here is the subject's epistemic model which may be seen as including worlds representing future realizations of the actual world, designated as $M_{\text{Efut}}(\text{su})$ — though desires can also be about the past, but I ignore these cases here as they do not seem to alter the overall picture. $M_{\text{Efut}}(\text{su})$ is partitioned into two sets, say W_1 and W_2 . W_1 includes worlds in which p is true, so the following holds: $\forall w', w' \in W_1$ and $W_1 \subset M_{\text{Efut}}(\text{su})$, $\llbracket [p] \rrbracket = 1$ in w' , therefore $W_1 \subseteq p$. W_2 , the complement of W_1 , contains worlds where p is false: $\forall w'', w'' \in W_2$ and $W_2 \subset M_{\text{Efut}}(\text{su})$, $\llbracket [p] \rrbracket = 0$ in w'' , therefore $W_2 \cap p = \emptyset$. The worlds in W_1 are more desired alternatives than the worlds in W_2 , but still, from *want* (su, p) we cannot infer that p is true in $M_{\text{Efut}}(\text{su})$. We can also not infer that the actual world w_0 will be a member of W_1 , the set of worlds where p is true.

- (32) $\llbracket \text{thelo}(\text{su}, p) \rrbracket_c = 1 \not\rightarrow \llbracket [p] \rrbracket_{MEfut(\text{su})} = 1$ 'want'

A similar analysis can be given for the semantics of the other subjunctive-taking attitude verbs in (13). We may conclude, therefore, that (non)veridicality describes successfully the indicative versus subjunctive split in Greek. The crosslinguistic picture may be somewhat more complicated (cf. Quer 1998), but (non)veridicality certainly presents a necessary, if not the only, ingredient for the characterization of mood.

What about the verbs in (14)? Are aspectual, perception, and implicative verbs nonveridical? The answer is no. If I start doing *p* then *p* is true, if I see Mary *p* then *Mary p* is also true, and likewise, if I manage to *p*, *p* is true in some model, hence these verbs are veridical. One way to handle the contrast is to assume that *na* is in fact ambiguous between a veridical and a nonveridical function (as proposed in Giannakidou 1994b). Such a move might be independently motivated: as a veridical particle, complement *na* is close in meaning to deictic *na*; additionally, veridical *na*, in certain cases, can be replaced by the veridical conjunction *ke* ‘and’:

- (33) Κατάφερε και αγόρασε ένα σπίτι.
 katafere ke ayorase ena spiti
 managed-3SG and bought-3SG a house
 ‘He managed to buy a house.’

There are further syntactic differences distinguishing veridical *na* complements from nonveridical ones which I will not discuss here, but have been noted in the literature (see Terzi 1992; Varlokosta 1994; Holton et al. 1997). I will briefly mention two: (a) typically, the null subject in veridical *na* clauses is obligatorily bound by the matrix subject, but the subjects of nonveridical *na*-clauses do not exhibit this characteristic:

- (34) Θέλω να {φύγω/φύγει ο Παύλος}.
 thelo na {fiɣo/fiji o pavlos}
 want-1SG SUBJ go-1SG/go-3SG the Paul
 ‘I want to go.’/‘I want Paul to go.’
- (35) Συνέχισε να {χορεύει/ *χορεύω}.
 sinexise na {xorevi/ *xorevo}
 continued-3SG SUBJ dance-3SG dance-1SG
 ‘She kept on dancing.’

b. Veridical predicates impose aspectual restrictions on their *na*-complements. More specifically, some of them (i.e. the aspectual and perception verbs) require that the VP of the complement bear imperfective aspect. Nonveridical verbs do not pose such a requirement. The need to have imperfective aspect after perception verbs obviously relates to the fact that the *na*-complements express direct perception: among other things, the imperfective indicates the ongoing (see discussion in Section 4.1).

3. Polarity phenomena, negation, and negative concord

Nonveridicality and antiveridicality turn out to be central in the analysis of polarity as well, more specifically, in the characterization of polarity contexts. The contribution of Greek has been important in bringing forth generalizations which have far-reaching crosslinguistic implications. I consider polarity phenomena in Sections 3.1, 3.2; the related issues of negation and negative concord are discussed in 3.3.

3.1 Varieties of polarity

Polarity is a phenomenon widely attested across languages; the pattern involves expressions which occur only in sentences exhibiting some particular semantic characteristic.

- (36) a. I didn't see anybody.
 b. Did you see anybody?
 c. John may talk to anybody.
 d. *I saw anybody.

Expressions like English *any* are traditionally known as *polarity items* (PIs): they are ungrammatical in positive sentences, but are fine *inter alia* in negative sentences, questions, and with modal verbs, as we see. PIs are not uniform, but come in different varieties (all of which fall under definition 3 below). In Greek, four classes of PIs can be identified (Giannakidou 1998): two negation related PIs — “affective” in Klima’s (1964) terminology, free choice items (FCIs), and mood alternation in relative clauses. Affective PIs will be discussed in the next subsection. Examples of FCIs are items of the *opjosδipote* paradigm:

- (37) οποιοσδήποτε opjosδipote anyone, anybody, whoever
 οτιδήποτε otidipote anything, whatever
 οποτεδήποτε opoteδipote any time, whenever
 οπουδήποτε opuδipote any place, wherever

FCIs are ungrammatical in positive veridical and negative sentences with perfective aspect. They typically occur in nonnegative nonveridical contexts allowing for variation, e.g. intensional, habitual, generic, and modal sentences:

- (38) *(Δεν) είδα οποιονδήποτε.
 *(den) ida opjondipote
 not saw-PERF-1SG any-person
 ‘*I didn’t see whoever.’
 ‘* I saw whoever.’
- (39) Οποιοσδήποτε φοιτητής μπορεί να λύσει αυτό το πρόβλημα.
 opjosdipote fititis bori na lisi afto to provlima
 any student can SUBJ solve-3SG this the problem
 ‘Any student can solve this problem.’

The sentence (39) has a flavor of arbitrariness implying that identity is not important: any student we consider, it doesn’t matter who the student might be, will have the ability to solve this problem. Hence statements like (39) give the impression of universal-like meaning; Giannakidou (1998, 2000a), however, argues that FCIs are not universal quantifiers but intensional indefinites. A variety of the properties of FCIs (such as plural interpretation, incompatibility with perfective aspect, and the distribution in intensional, modal and habitual contexts) can be made to follow from this hypothesis.

Mood alternation in relative clauses is discussed in Veloudis (1983/84), Rouchota (1994), Quer (1998) and Giannakidou (1998), where it is embedded into the theory of polarity. The basic fact concerns the possibility of having *na* in the relative clause modifying an indefinite NP:

- (40) Η Μαρία θέλει να παντρευτεί έναν άντρα που (να) έχει πολλά
 i mariaothi na pandrefti enan andra pu (na) exi pola
 lefta
 ‘Mary wants to marry a man who has a lot of money.’

The English translation of the sentence is ambiguous between the two readings we see in (41) and (42). Under the reading in (41), the indefinite *a man who has a lot of money* is interpreted inside the scope of the intensional verb *want*, and the existence of a man that will meet the description conveyed by the NP modified by the relative clause is not warranted. Under the reading in (42), on the other hand, the existence of such a man is given in the actual world, because *a man who has a lot of money* is interpreted outside the scope of *want*:

- (41) WANT (Maria, ($\exists x$ [**man** (x) \wedge **has-a-lot-of-money** (x) \wedge **marry** (Maria, x)]))
- (42) $\exists x$ [**man** (x) \wedge **has-a-lot-of-money** (x) \wedge WANT (Maria, **marry** (Maria, x))]

In Greek, the ambiguity is resolved by mood choice (and similarly in Romance, see Farkas 1985; and for a more recent discussion Quer 1998). If the relative clause modifying *enan andra* 'a man' contains *na*, the sentence receives the narrow scope interpretation (41); if *na* is absent, *enan andra* 'a man' has only the wide scope reading in (42). Hence subjunctive relatives and their indicative counterparts are PIs: their distribution is regulated by whether existence inferences are available (indicative relatives) or not (subjunctive relatives); for more discussion on this point see Giannakidou (1998: 85–92). As expected, subjunctive modification is disallowed with extensional verbs, as these imply existence.

At a general level, the semantic property that licenses PIs has been the object of a long debate which focussed almost exclusively on *any*. Baker (1970) argues that the crucial semantic property is negation (hence the term 'negative PI'), Linebarger (1980) proposes an extension based on negative implicature, Horn (1972) and Fauconnier (1975) argue for a generalization based on *scale reversal*, and Ladusaw (1979) proposes a formal semantic account postulating that PIs are acceptable only in the scope of expressions which denote downward entailing (DE) functions. Unlike upward entailing (UE) functions, which are order preserving, DE functions are order reversing, hence expressions denoting such functions support inference from sets to subsets, e.g. negation:

- (43) Lucy does not like ice cream.
 Italian ice cream \subseteq ice cream
 \therefore Lucy does not like Italian ice cream.

In positive sentences, on the other hand, we get UE inferences, we can thus replace expressions denoting subsets with expressions denoting super-sets: *Lucy likes Italian ice cream* implies that *Lucy likes ice cream*, but not the reverse. PIs are excluded from UE contexts.

Giannakidou (1993, 1997, 1998, 1999) shows that such approaches fail as general theories of polarity, because there are polarity environments which are not strictly speaking negative, scale reversing, or DE, *inter alia* modal verbs and questions. The argument is supported by a closer investigation of Greek, English, Dutch, and other languages (e.g. Russian, Romanian; see Haspelmath 1997 for extensive data). The investigation makes clear that nonveridicality is the formal semantic property shared by polarity contexts:

(44) **DEFINITION 3** (Polarity item).

A linguistic expression α is a polarity item iff:

- (i) The distribution of α is limited by sensitivity to some semantic property β of the context of appearance; *and*
- (ii) β is (non)veridicality, or a subproperty thereof.

Negative and DE operators are proper subsets of the nonveridical, hence the definition above allows for sensitivity to negation or DE under the more general case of sensitivity to nonveridicality. It is not the purpose here to give detailed analyses of all the relevant cases; for the remainder of this section I will concentrate on the cases that have attracted most attention in the literature.

3.2 Affective polarity

Greek has the two negation-related ('affective') PI-paradigms we see below, which are distinguished by means of emphatic accent, as first observed in Veloudis (1982):

- | | | | |
|------|------------------------------|----------------------------|---------|
| (45) | kanenas/KANENAS ⁵ | 'anyone, anybody/n-person' | κανένας |
| | tipota/TIPOTA | 'anything/n-thing' | τίποτα |
| | pote/POTE | 'ever/n-ever' | ποτέ |
| | puθena/PUTENA | 'anywhere/n-where' | πουθενά |

Uppercase letters indicate emphatic accent, not related to focus for reasons discussed in Giannakidou (1997, 1998:227–231); see, however, Tsimpli & Roussou (1996) for a focus-based syntactic proposal. (The semantic part of Tsimpli & Roussou's proposal, namely that nonemphatic items are licensed by modality, is in agreement with the earlier analysis in Giannakidou (1993), where this is proposed and which can be seen as a variant of the nonveridicality hypothesis). I follow here Giannakidou (1998, 2000b) in assuming that emphatics are lexically distinct (but Veloudis 1982; Giannakidou 1997; Giannakidou & Quer 1995, 1997 treat them as one paradigm). Emphatic accent, then, is equivalent to morphological marking, which is not a 'peculiarity' specific to PIs, but a strategy employed elsewhere in the grammar of Greek (e.g. in order to distinguish between *LIJI* 'few' and *liji* 'a few', and *POLI* 'too' versus *poli* 'very'). Using suprasegmental features for morphological distinctions is quite common across languages, typical exponents being tone or stress (e.g., *pérmit* (noun) versus *permit* (verb) in English).

Emphatic and nonemphatic PIs must be construed with negation or *xoris* 'without' in order to be grammatical, but nonemphatics are also licensed in a

broad array of nonnegative environments including *inter alia*, modal verbs, interrogatives, imperatives, and the scope of nonveridical verbs like *thelo* ‘want’ and *elpizo* ‘hope’. Emphatic items are ungrammatical in nonnegative constructions. The following examples partially illustrate this contrast:

- (46) a. Η Θεοδώρα *(δεν) ενέκρινε {κανένα/KANENA} σχέδιο.
 i θεοδώρα *(δεν) enekrine {kanena/KANENA} sxedio
 ‘Theodora didn’t approve any plan.’
 ‘Theodora approved no plan.’
 b. *(Χωρίς) να δει {κανέναν/KANENAN}...
 *(xoris) na di {kanenan/KANENAN}...
 ‘Without seeing anybody...’
- (47) Πήγες {ποτέ/*ΠΟΤΕ} στο Παρίσι;
 piges {pote/*POTE} sto parisi
 ‘Have you ever been to Paris?’
- (48) Αν δεις {κανέναν/*KANENAN}...
 an dis {kanenan/*KANENAN}...
 ‘If you see anybody...’
- (49) Ελπίζω να έμεινε {κανένα/*KANENA} κομμάτι.
 elpizo na emine {kanena/*KANENA} komati
 ‘I hope there is a piece left.’
- (50) Πάρε {κανένα/*KANENA} μήλο.
 pare {kanena/*KANENA} milo
 ‘Take an apple.’

In these contexts, nonemphatics are interpreted as existential quantifiers, but emphatics may give the impression that they are negative — an issue to be considered shortly. The value assigned to emphatics may be viewed as ranging upon a scale, as in Fauconnier (1975) and Horn (1972) (see Delveroudi 1989 for discussion in this spirit). Crucially, the contexts above are not negative or DE; in fact it can be shown that some of them are upward entailing, or that they do not allow inference in either direction. For example, from an imperative *take an apple* we cannot infer *take a red apple*, nor can we infer the opposite; imperatives are thus non-monotone, a generalization which seems to hold for the whole class of intensional expressions. The contexts above are nonveridical, and the Greek PIs appear unproblematically in such contexts. Other nonveridical environments that allow for nonemphatics but not emphatics are exclamatives, habituais and generics, disjunctions, and the restriction of universal quantifiers; as mentioned before, this holds for other languages as well as for Greek. Based

on the observed distributional differences we can characterize nonemphatics as affective polarity items (APIs) and emphatics as negative polarity items (NPIs).

(51) **DEFINITION 4** (Affective polarity item)

A polarity item α is *affective* iff it is licensed by *nonveridical* operators.

(52) **DEFINITION 5** (Negative polarity item)

An affective polarity item α is a *negative polarity item* iff it is licensed by *antiveridical* operators.

“Being licensed by” raises the question of scope, and in most cases, licensing corresponds to a condition requiring that the PI *be in the scope* of the licenser. Crucially, however, licensing is a form of semantic dependency, and as such it does not map necessarily into a syntactic *be in the scope of* condition. In some cases, for instance with emphatic NPIs as we shall see below, licensing corresponds to an anti-scope condition. We expect the precise scope condition to be determined by the semantics of the PIs themselves, and more work is needed before we understand the details of the various PI-paradigms; one question that remains open, for example, is how to capture the intervention effects of other quantifiers in polarity contexts.

Besides nonemphatics, other APIs can be identified: *akoma* ‘still/yet’ (see Setatos 1987), and the modal verb *xriazete* ‘need’. Other NPIs in Greek include *kan* ‘not even’, possibly *pja* ‘anymore’, and bare singulars as minimizers like *leksi* ‘word’ (as in *den ipe leksi* ‘he didn’t say a word’). Sioupi (to appear) observes that non-polarity bare singulars always take narrow scope with respect to other operators in a sentence, showing an important parallel to their polarity uses.

To conclude, by invoking a notion broader than DE and negation, we are able to construe a theory of polarity which affords a much greater empirical coverage, and provides a solid basis for the unification of affective environments as a natural class across languages. The contribution of Greek has been very important in bringing about this result.

3.3 Negation and negative concord

Negative concord (NC) is observed in many languages, e.g. Romance, Slavic, Hungarian, West Flemish, Afrikaans, and certain varieties of English. Broadly, we speak of NC in situations where negation is interpreted just once although it seems to be expressed more than once in the clause. Greek also exhibits NC: (46a) constitutes a typical case, and I give here another example; see Veloudis’ (1982) seminal work on negation where construals like these were first identified:

- (53) $*(\Delta\epsilon\nu)$ εἶπα ΤΙΠΟΤΑ.
 $*(\delta\epsilon\nu)$ ἰπα ΤΙΠΟΤΑ
 'I didn't say anything.'

We talk about NC here because *TIPOTA* seems to be able to convey negative meaning as a fragment answer in the absence of sentential negation *den*: Q: *ti ipes?* 'What did you say? A: *TIPOTA*. 'Nothing'. (With nonemphatics the issue of NC does not arise, as these are existentials, cf. 3.2). NC poses an obvious puzzle for the syntax-semantics interface: if we have more than one occurrence of negation in a clause, why do we end up interpreting only a single negation? We do not want to give up compositionality as the principle of semantic interpretation, nor do we wish to argue that languages with NC are less "logical" than languages without it.

Two types of solution have been proposed in the literature. The first takes NC words like *TIPOTA* (*n-words* in Laka's 1990 terminology) to be negative quantifiers which merge, with each other and sentential negation, into one semantic negation (negative absorption). Quer (1993) proposed an account along these lines for Greek. (Klidi 1994 presents a syntactic variant based on Progovac's 1994 binding analysis). Yet there is little evidence that emphatics are inherently negative, and apparent cases that might indicate so, e.g. fragment answers, are due to ellipsis (Giannakidou 1998, 2000b). Alternatively, the thesis that *n-words* are inherently negative has been dismissed. Instead, it is argued that in NC negation is expressed only by sentential negation and that *n-words* are indefinites with no quantificational force of their own (Ladusaw 1994; for Greek Giannakidou 1997; Giannakidou & Quer 1995, 1997). Veloudis (1982) suggests a variant of this approach by analyzing emphatics as involving existential quantifiers in the scope of negation, as in (54b):

- (54) *Logical representations of general negative statements*
 a. $\forall x [P(x) \rightarrow \neg Q(x)]$ (Universal negation)
 b. $\neg \exists x [P(x) \wedge Q(x)]$ (Existential negation)

In Giannakidou (1998, 2000b) it is shown that the existential/indefinite analysis is not likely to be the correct analysis for emphatics. Unlike indefinites, whose scope is unbounded, emphatics appear to obey familiar constraints on universal quantifiers: their scope is generally quite local, and almost clause-bound, with the exception of *na*-complements which allow scoping of universal quantifiers too (for constraints on the scope of universal quantifiers in Greek and English see Farkas & Giannakidou 1996). Additionally, emphatics align with universal

quantifiers in a number of other crucial semantic respects, some of which I briefly illustrate below:

- a. *Almost/absolutely modification*. \forall -quantifiers, but not \exists , can be modified by *almost/absolutely*. We see below that only emphatics admit *almost/absolutely* modification.

- (55) a. *Electra was willing to accept {almost/absolutely} something.
 b. Electra was willing to accept {almost/absolutely} everything.
 c. Δεν είδα {σχεδόν / απολύτως} {*κανέναν / KANENAN}.
 den ida {sxedon / apolitos} {*kanenan / KANENAN}
 not saw-1SG almost absolutely n-person
 'I saw almost nobody.'

- b. *ke-modification* (see also Quer (1993)). *Ke* 'and' is a modifier of existential quantifiers, and emphatics are incompatible with it. This expression is comparable to Dutch *ook maar*, German *auch nur* and English *even*.

- (56) a. Όλο και {κάποιος / *καθένας} έρχεται το πρωί.
 olo-ke {kapjos / *kaθenas} erxete to proi
 olo-ke someone everyone come-3SG the morning
 'Someone (usually) comes in the morning.'
 b. Δεν είπε και {τίποτα / *ΤΙΠΟΤΑ} σπουδαίο.
 den ipe ke {tipota / *TIPOTA} spudao
 'He didn't say anything important.'

- c. *Use as predicate nominals*. On a par with universals and unlike non-emphatics, emphatics cannot be used as predicate nominals:

- (57) Δεν είναι (και) {κανένας / *KANENAS} γιατρός.
 den ine (ke) {kanenas / *KANENAS} jatros
 'He is no doctor.'

- (58) Frank is {a / *every} friend of mine.

Partee (1987) discusses restrictions on the availability of type-shifting to *predicative* (type $\langle e, t \rangle$) interpretations, and shows that universal quantifiers like *every*, unlike existential indefinites, cannot shift to this type and be used as predicate nominals. The unacceptability of emphatics in predicate nominal positions indicates clearly that emphatics are like *every* in this respect. Note that *He is no doctor* and its Greek counterpart are not equivalent to the respective structures with *negation* + *indefinite NP*. *He is no doctor* can be true even if one is a doctor, but not a good one; *he is not a doctor* is false in this situation.

Additional semantic evidence that emphatics align with universals comes from donkey anaphora and the availability of existence inferences under negation. Giannakidou (2000b) proposes, therefore, that emphatics instantiate with negation a logical structure like (54a) (leaving (54b) for nonemphatics). Unlike regular universals, however, emphatics are also NPIs, and as such they require the presence of negation for licensing; but for the correct interpretation of NC, they must raise and scope over negation at the level of LF. This movement can be seen as an instance of quantifier raising (QR), and is local just like QR standardly is (May 1985).

As a result of this analysis, NC need not involve a special rule in the grammar, but it is reduced to the more familiar case of quantifier scope. Given that the usefulness of QR has been questioned recently, this analysis provides a strong argument for retaining QR as a necessary device at the syntax-semantics interface: we need it in order to interpret NC. As with polarity, the contribution of Greek has been crucial in constructing this argument.

4. Other topics

In this last section, I consider topics in the syntax-semantics interface that have received attention through the years, but which I cannot handle in more detail due to lack of space. The issues involved, however, undoubtedly represent very productive research paradigms with significant theoretical implications in many cases, and are certainly worthy of a detailed examination on their own.

4.1 Aspect, tense, and modality

Sentences refer to eventualities. Tense locates these eventualities in time by relating their time to some other time, either to the utterance time or to the time of another eventuality (reference time). Aspect is independent, and quite different from tense. Through aspectual meaning (a) we grasp what type of eventuality we are talking about (lexical aspect or *Aktionsart*), and (b) we look at the internal consistency of the eventuality (*nonlexical* aspect). The two are independent, though interacting in many ways. Lexical aspect gives information regarding the ontology of eventualities, and its source is to be found in the lexical meaning of the verb: it tells us whether we are dealing with an event (*Frank saw Lucie*), a process (*Frank runs*), or a state (*Frank is ill*).

Nonlexical aspect encompasses the following distinctions: *perfective-imperfective*, *habitual-episodic*, and the *progressive*. Languages differ significantly in the nonlexical aspectual meanings they express and the grammatical means they use to express them. Slavic and Greek have obligatory perfective/imperfective marking on verbal morphology, but the Germanic languages do not (there is a massive literature on this issue; see Comrie 1976, and references therein). The Greek verb exhibits the following four combinations, imperfective nonpast (INP), perfective nonpast (PNP), imperfective past (IP), and perfective past (PP):

- (59) a. γραφ- -ο (INP)
 write.**IMPERF** -1SG.NONPAST
 ‘I am writing (right now).’
 ‘I write (generally).’
 b. γραπ- s- -ο (PNP)
 write- **PERF** -1SG.nonpast
 [no English equivalent]
- (60) a. e- γραφ- -α (IP)
 PAST- write.**IMPERF** -1SG.PAST
 ‘I used to write.’
 ‘I was writing.’
 b. e- γραπ- s- -α (PP)
 PAST- write- **PERF** -1SG.PAST
 ‘I wrote.’

The primary goal of studying the tense-aspect system of Greek is to describe the precise semantic content of these verbal forms, and the ensuing conditions on their use. At a basic level, PP sentences denote events that have taken place at some point in time, and the imperfective forms are ambiguous between habitual/generic and progressive interpretations. Newton (1979), Newton & Veloudis (1980a,b) present a characterization of the aspectual contrast in interaction with modal verbs employing formalism from tense semantics (using tense variables, see especially Newton 1979). The relative scope of aspect and modality is also examined in order to account for aspect preferences in cases where both aspects are allowed; in more recent studies, the perfective-imperfective distinction has been reformulated in event semantics (Giannakidou 1996; Giannakidou & Zwarts 1999, to appear). The latter also examine the interaction between tense/aspect and polarity, and the semantics of temporal connectives such as *molis* ‘as soon as’, *otan* ‘when’, and *prin* ‘before’. Additionally, Giannakidou & Zwarts (to appear) explain the impossibility of the PNP as

a free standing form as a polarity effect: PNP events cannot be located in the present since there are no perfective present events (this is a crosslinguistic fact); consequently, PNP is a genuinely nonveridical form occurring only with nonveridical particles and connectives.⁶ Giannakidou & Merchant (1997) further discuss the interaction of aspect with donkey anaphora. Finally, the relation between NP-interpretation and genericity has been addressed in Condoravdi (1989, 1992). In the former, the emphasis is on middle constructions like *To krase pinete efcharista* 'This wine drinks easily' which are shown to be generic; this analysis is adopted in Sioupi (1998), where it is further shown that middles without adverbials, e.g. *To nero afto pinete* 'This water is drinkable' involve a hidden modal, cf. English *-able*.

Lexical aspect is discussed in Mozer (1994); Hila-Markopoulou & Mozer (to appear) further examine the interaction of lexical aspect and NPs within the VP; they suggest that the referentiality of NP-complements is related to the telicity of the verb predicate. Giannakidou & Merchant (1999) address the role of lexical aspect in constraining syntactic secondary predicates in resultative constructions. They attempt to explain why Greek lacks the productive strategy that English employs, illustrated in the example below:

- (61) Η Αριάδνη πότισε τα φυτά (*επίπεδα).
 i ariaðni potise ta fita (*epipeða)
 the Ariadne watered-3sg the plants flat
 'Ariadne watered the plants (flat).'

Resultative constructions involve complex event structures: they comprise a process, in this case Ariadne's watering, which leads to a result, in this case the plants being flat, provided by the secondary predicate in English. Greek, unlike English, employs productively certain verbal affixes, e.g. *-izo*, *-ono*, *-evo*, *-pio*, etc. and, according to Giannakidou & Merchant (1999) the result argument is provided already by those affixes. Hence there is no need to employ a secondary predicate, since only one result is allowed per structure (Tenny 1987). Similarly, when English employs a resultative affix, e.g. *-ify*, resultative secondary predicates are disallowed, as in **The teacher simplified the exercise easy*.

Two more studies are noteworthy with respect to the semantics of aspect: Tzeveleku (1995), which presents a rather detailed description of lexical and non-lexical aspect in Greek, and Veloudis (1992), which looks contrastively at tense, aspect and modality systems.

Tense is discussed in most of the above-mentioned studies. In addition, Veloudis (1989) discusses the Greek perfect, and Iatridou, Anagnostopoulou &

Izvorsky (to appear) remark on the availability of a universal reading for the perfect, i.e. the reading that usually arises with perfects of stative verbs in English, illustrated below:

- (62) a. I have been sick since 1990.
 b. $\exists i [\text{begin}(i) = 1990 \wedge \text{now} \in i \wedge \forall t \in i (\text{sick}(I, \text{at } t))]$

According to this reading, there is an interval starting in 1990 which includes now, and I have been sick at every instance of time included in that interval. (Existential readings, i.e. that I have been sick at some instance(s) in that interval are of course also available.). Iatridou et al. claim that this reading is not available with Greek statives, but the claim does not seem entirely accurate. The sentence below, with *ayapo* ‘love’ does have a universal reading, implying that the love-state holds constantly through the indicated interval, including now:

- (63) a. Από τη στιγμή που έμαθα τι έχει κάνει για μένα, τον έχω
 apo ti stiyimi pu emaθα ti exi kani ja mena ton exo
 αγαπήσει βαθιά.
 agapisi vathia
 ‘Since the moment I found out what he did for me, I have loved him deeply.’
 b. $\exists i [\text{begin}(i) = \text{the moment I found out what he did for me} \wedge \text{now} \in i \wedge \forall t \in i (\text{love-deeply}(I, \text{him}, \text{at } t))]$
 c. #Αλλά δεν τον αγαπάω πια.
 ala den ton agapao pia
 ‘#But I don’t love him anymore.’

The continuation in *c* is contradictory. This is exactly what we expect if *exo agapisi* ‘have loved’ in (63) has the designated universal reading in *b*.

Iatridou (2000) presents a discussion of conditional sentences, addressing specifically the interpretation of tense and aspect in this context. Among other things, uses of IP in conditionals like the ones below are discussed, where both the past and the imperfective meanings seem to be lost:

- (64) Αν έπαιρνε αυτό το σιρόπι θα γινόταν καλά.
 an eperne afto to siropi tha jinotan kala
 if took-IP-3SG this the syrup FUT become-IP-3SG well
 ‘If he took this syrup, he would get well.’

Iatridou notes that the sentence can be uttered as an instruction to the caretaker, and not necessarily as a past conditional or counterfactual. Greek conditionals

have also been extensively described in work by Nikiforidou (1990), although not in a formal semantic framework.

Modal verbs have also been the object of a number of studies. Iatridou (1990) comments on the distinction between ability and epistemic modality with *bori* ‘can’ and links the difference to the presence or absence of tense (and agreement) in the modal verb. Giannakidou (1994, 1997) proposes an analysis of Greek modals as quantifiers over possible worlds restricted by modal bases, in the spirit of Kratzer (1981); the personal *bori* is revisited in Giannakidou (2000a), and in its ability reading it is analyzed as a universal quantifier over possible worlds. More descriptive studies of Greek modals include Iakovou (1998), and Papafragou (1998) in a relevance-theoretic framework.

4.2 Ellipsis

A detailed description of Greek ellipsis is found in Milapidis (1990). The topic has been revived recently in a number of studies in the syntax-semantics interface. Though Greek does not exhibit VP ellipsis, it does exhibit other kinds of ellipsis, illustrated below:

(65) (stripping)

H Αριάδνη έφυγε αλλά όχι η Ζωή.
 i ariaðni efije ala oxi i zoi [efije]
 the Ariadne left-3sg but not the Zoë
 ‘Ariadne left but not Zoë.’

(66) (gapping)

H Αριάδνη έφερε λουλούδια και η Ζωή σοκολάτες.
 i ariaðni efere luluðia ke i zoi [efere] sokolates
 the Ariadne brought-3sg flowers and the Zoë chocolates
 ‘Ariadne brought flowers and Zoë chocolates.’

(67) (sluicing)

H Αριάδνη αγαπάει κάποιον αλλά δεν ξέρω
 i ariaðni aɣapai kapjon ala den ksero
 the Ariadne loves someone but not know-1sg
 ποιον.
 pjon [aɣapai i ariaðni]
 who
 ‘Ariadne loves someone but I don’t know who.’

(68) (NP-ellipsis)

Η Αριάδνη αγόρασε ένα καινούριο αυτοκίνητο μόλις πούλησε το
 i ariaðni agorase ena kenurjo aftokinito molis pulise to
 παλιό.

paljo [aftokinito].

‘Ariadne bought a new car as soon as she sold the old one.’

There is no isomorphic mapping onto English ellipsis — e.g. NP-ellipsis is allowed in Greek, but not in English (Giannakidou & Stavrou 1999 attribute the difference to the rich Greek nominal morphology, following the relevant literature, e.g. Lobeck 1991). Greek also has indefinite object drop, a phenomenon discussed in Giannakidou & Merchant (1996) and Keller and Lapata (1999):

(69) Q: Έφερε ο Αντρέας {μερικά/κάποια/τρία/τίποτα/Ø} βιβλία;

efere o andreas {merika/kapja/tria/tipota/Ø} vivlia

‘Did Andreas bring {several/some/three/any/Ø} books?’

A: Ναι, (*τα) έφερε.

ne (*ta) efere [e]

yes them brought-3sg

‘Yes, he brought {several/some/three/some/Ø} books.’

Giannakidou & Merchant argue that indefinite argument drop is not VP ellipsis. Keller & Lapata propose a DRT account further arguing that the phenomenon is related not just to (in)definiteness, but to the anaphoric status of the involved NPs. Two things are noteworthy about the pattern in (69). First, the answer is understood in direct relation to the quantity specified in the question; second, the definite clitic pronoun *ta* is ungrammatical in the response. This is expected, since clitic pronouns in Greek can only be linked to referential (strong) DPs (Anagnostopoulou & Giannakidou 1995), and here the question introduces no such antecedent. We find the opposite pattern in the response to a question with a strong DP, where clitics are needed: *efere o andreas ola ta vivlia?* ‘Did Andreas bring all the books?’ *ne *(ta) efere* ‘Yes, he brought them.’

Giannakidou & Merchant (1998) propose an analysis of ‘reverse’ sluicing which relies crucially on the availability of indefinite null arguments in Greek. Merchant (to appear) further discusses Greek sluicing in his general discussion of sluicing (see also Merchant 2000). The contribution of Greek has been essential in bringing about novel generalizations concerning form identity in ellipsis, which lead to the conclusion that there must be syntactic structure in the ellipsis site. Additionally, Merchant advances the argument that ellipsis is

licensed under semantic and not syntactic identity, and emphasizes the role of focus. Giannakidou & Stavrou (1999), in the same spirit, postulate a condition based on semantic contrast as the condition governing NP-ellipsis. Finally, Giannakidou & Stavrou distinguish NP-ellipsis syntactically and semantically from nominalization, a type-shifting semantic operation which takes a predicate as its input and yields a kind as its output (see Chierchia 1998). As a consequence of that analysis, the ambiguity of the Greek definite determiner between a referential and a generic reading is translated into the following: in the referential use the definite determiner denotes the uniqueness ι -operator, but in the generic use it denotes the intensionalized nominalization operator.

4.3 *Pseudoclefts and free relatives*

There is a lively debate on the issue of Greek pseudoclefts and the interpretation of free relative clauses (FRs; see Veloudis 1979; Iatridou & Varlokosta 1998; and Alexiadou & Giannakidou 1998, 1999). I summarize here the gist of that discussion. Pseudoclefts are copular structures where one of the phrases surrounding *be* is a *wh*-element (typically taken to be a FR):

- (70) What John is is silly.

We may refer to the non-*wh*-part as the *pivot* of the pseudocleft, and to the *wh*-part as the *nonpivot*. In Greek, nonpivots may also contain demonstratives. Higgins (1979) argues that pseudoclefts may be *predicational* or *specificational*. The two readings are illustrated below:

- (71) a. John is P. Being P is silly. or, P-hood is silly (predicational)
 b. John is the following: silly. (specificational)

Under the predicational reading, (70) has a subject-predicate structure, but under the specificational reading, it can have an equative, or a list structure, as Higgins himself argues. Higgins envisioned lists as (possibly open) sets of individuals or properties, so (70) expresses something like $\{P \mid P \text{ is a property that John has}\} = \{\text{silly}, \dots\}$.

Iatridou & Varlokosta (1998) argue that Greek (and also Spanish, Catalan) lacks specificational pseudoclefts, but Veloudis (1979) and Alexiadou & Giannakidou (1998, 1999) show that this is not true. The following is a typical example of a Greek specificational pseudocleft (similar examples are found in Spanish, Catalan):

- (72) {Ο,τι/αυτό που} έφαγε ο Πέτρος όλη μέρα ήτανε πατάτες.
 {oti/afto pu} efaje o petros oli mera itane patates
 what(ever) ate-3sg the Peter all day was potatoes
 'What Peter ate all day was potatoes.'

Alexiadou & Giannakidou, building on Higgins' insight, analyze specificational sentences as involving lists, and propose a formal distinction between equation and specification in order to capture the two main classes of specificational sentences. Additionally, the impact of their discussion is that it provides crosslinguistic support to the analysis of FRs as definite descriptions, and not as universal quantifiers (*pace* Iatridou & Varlokosta 1998).

5. Conclusions

Though the formal semantic study of Greek constitutes a relatively young endeavor, I hope to have shown that it has given some concrete results with clear and significant crosslinguistic theoretical implications. Most prominently, the results are to be seen in the areas of mood selection and complementation, polarity, negative concord, and aspect, but the ongoing research in these and other directions promises exciting new discoveries as well as better understanding of more familiar phenomena. There is certainly reason for optimism, but it is also useful to remember that the project is still at the beginning in many respects — a number of topics call out for further exploration, among which we may distinguish the following: quantification, binding, scope, and NP interpretation in the syntax-semantics interface; the varieties of ellipsis; the representation and interpretation of focus; the syntax-semantics interface of tense and aspect, including the interpretation of tenses in conditionals and embedded structures, and tense/aspect in narrative discourse; and the semantics of temporal and other connectives. To these, we may add virtually unexplored territories like *wh*-quantification and the interaction with other quantifiers, the syntax-semantics of relative clauses, and comparative structures. The future lies ahead — full of challenges and opportunities.

Notes

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the strength and dynamics of Greek semantics, and to give a taste of how intellectually exciting and rewarding working on semantics can be.

1. Another step towards extending meaning beyond truth conditions is the development of theories describing the meaning of non-assertive sentences, e.g. imperatives and interrogatives (see Karttunen 1977; Groenendijk & Stokhof's 1997 logic of interrogatives and references therein). In these theories, truth conditions are replaced by answerhood or fulfillment conditions, and central notions of inference, e.g. entailment, are adjusted accordingly; the discussions are cast in dynamic frameworks like the ones mentioned here.
2. Given the quite extensive pattern of mood shifts, it is perhaps more accurate to talk about compatibility with mood rather than exclusive mood selection. I will keep on talking about 'selection' with this intended meaning here. Note that, in most cases, mood shift is accompanied by a meaning shift: *ksero oti/pu* means 'I know that' but *ksero na* means 'I have the ability to' as in *ksero na kolibo* 'I know how to swim'. Likewise, *pistevo oti* has the standard epistemic meaning, but *den pistevo na* has a directive meaning 'I don't expect that' (see the example in the text). These cases suggest that one meaning must be acknowledged as primary, and apparently this determines the primary mood selection; the second, shifted reading is derivable from the primary reading.
3. Farkas 1985, 1992 introduces a distinction between strong and weak intensionality in order to account for this fact. Verbs meaning *believe*, *dream*, and *think* are weak intensional in her system and this means that they are evaluated with respect to one world, as opposed to the strong intensional ones of the *want*-paradigm which are still evaluated with respect to a set of worlds. Useful though the distinction may be, it certainly implies a radical deviance from the standard practice in possible world semantics where *all* intensional predicates are evaluated with respect to sets of worlds.
4. Hence the subjunctive *na* is to be distinguished from the deictic *na* used in construals like *na o janis* 'Here is John!'. Deictic *na* does indicate directness since it requires spatio-temporal salience (see also Christidis 1985).
5. *Kanenas/KANENAS* also appears as *kanis/KANIS*, but I will not consider the differences.
6. The issue of performatives can be raised here. Interestingly, performative verbs in utterances like *aporipto ton isxirismo su oti...* 'I reject your claim that...' appear in the INP, and not the PP, although it is true that by uttering a performative sentence we actually perform the act named by the verb. An important feature of performatives, however, is that once the act is performed, we enter a state during which the act holds (to be ended only with the utterance of a new performative). In this sense performatives are not simple, but complex eventualities, comprising an event and a state whose beginning is the performance of that event. If this is so, then imperfective aspect is expected, and performatives do not really threaten the generalization presented here that there are no perfective present events.

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Περίληψη

Το παρόν άρθρο περιγράφει και εκτιμά την πορεία της «Ελληνικής Σημασιολογίας». Με τον όρο αυτό χαρακτηρίζουμε τη μελέτη των σημασιολογικών φαινομένων της Ελληνικής γραμματικής και του διεπιπέδου σύνταξης και σημασιολογίας. Επισημαίνονται τα θέματα που κατά κύριο λόγο έχουν απασχολήσει την έρευνα μεταξύ άλλων: έγκλιση, συμπληρωματικές προτάσεις, άρνηση και πολικότητα, χρόνος — ρηματική όψη-τροπικότητα και έλλειψη. Από την παρουσίαση καταδεικνύεται ότι τα αποτελέσματα της Ελληνικής Σημασιολογίας έχουν σημαντικές θεωρητικές συνέπειες όσον αφορά το γενικό σχεδιασμό της γραμματικής και βεβαίως την ανάλυση άλλων γλωσσών.